was replaced by another individual, and the procedure was repeated. A total of 500 observations were recorded for each species.

A chi-square analysis of the observed and expected values shown in Table 1 resulted in a chi-square value of 36.669, with 10 degrees of freedom. This is significant at an α level of 0.001, and strongly indicates that the temperature preferences of the two species are different. Both species show a maximum preference for 26 degrees C. However, except for this similarity, the two species are quite different in their preferences. *Eleodes longicollis* shows more preference for the lower temperatures, while *E. obscura* prefers higher temperatures.

This difference in temperature preferences of the two species may be explained as an evolutionary strategy to escape inclement weather. At higher elevations, low temperatures usually signal the onset of snow and prolonged periods of cold. At lower elevations in subarid zones, this is not generally the case. However, in subarid regions higher temperatures signal the onset of conditions that may approach a thermal lethal limit for a beetle. The present data suggest that *E. longicollis* may be better adapted to lower elevations, while *E. obscura sulcipennis* may be better adapted to higher elevations.—C. N. SLOBODCHIKOFF AND D. PEDERSEN, *Department of Biological Sciences, Northern Arizona University, Flagstaff 86001.*

Simple Arthropod Activity Monitor.—The principle of an arthropod's (or other small animal's) body completing a path for current flow makes possible a simple, reliable activity monitor. It is simpler and more reliable than previously used photoelectric devices (Brown, 1959, J. Ins. Physiol. 3: 125–126; Brown and Unwin, 1961, J. Ins. Physiol. 7: 203–209), actographs (Gunn and Kennedy, 1936, J. Exp. Biol. 13: 450–459; Reichle, et al., 1965, Amer. Midl. Natur. 74: 57–66), activity wheels (Kramm, 1971, Amer. Midl. Natur. 85: 536–540), and switching devices (Naylor, 1958, J. Exp. Biol. 35: 602–610).

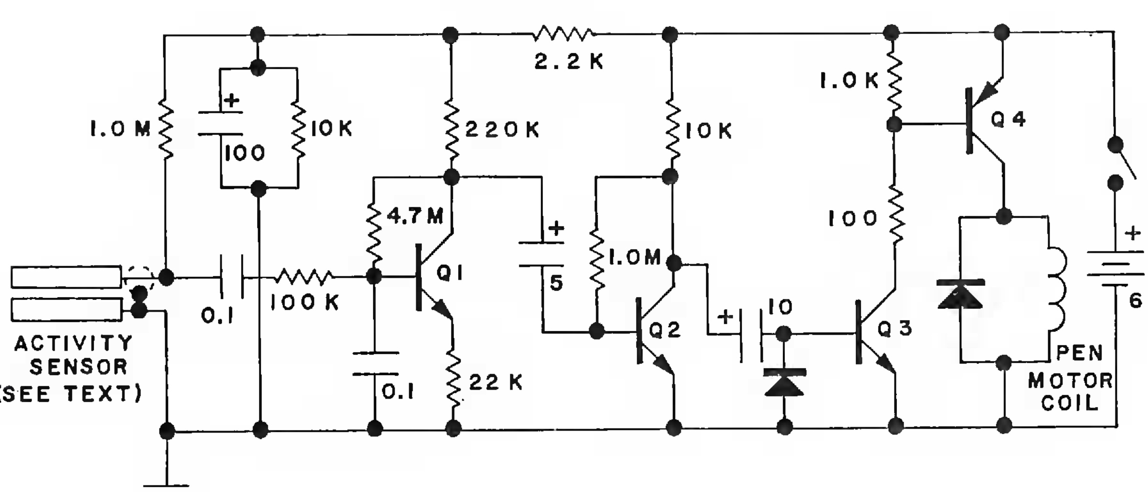

FIG. 1. Schematic diagram of the activity monitor. Resistance in ohms. Resistors ± 10% ¼ W. Capacitors in microfarads. Polarized capacitors are 10 volt electrolytics; others disc ceramic. Diodes 1N756. Transistors: NPN 2N3707; PNP 2N1305. Battery 6 volt (Burgess F4M). Parts available from Neward Electronics, 500 Pulaski Road, Chicago, Ill. 60624 or Allied Electronics, 2400 W. Washington Blvd., Chicago, Ill. 60612.

Fig. 2. Activity of *Ceuthophilus conicaudus* Hubbell maintained under constant temperature and darkness.

Two insulated conductive strips were separated by a distance of about half the body length of the insect to be studied. A low voltage was impressed across the strip with current limited to substimulus values by a current limiting resistor. Under open circuit conditions the source potential is across the strips. An arthropod walking across the conductive strips provides a path for current flow and lowers the voltage. The variation in voltage is amplified and operates an event recorder. The signal lead from the conductive strips should be shielded to minimize electrical interference. Brass shim stock material (available from automobile parts dealers) was used for the conductive strips. The wires can be soldered directly to the brass strips. A further reduction of noise may be obtained by extending the ground strip under the signal strip and insulating the two strips with mylar tape.

A complete schematic diagram is shown in Fig. 1. Current to the conductive strips is limited to less than 6 microamps by the series 1 Meg resistor. The resulting activity signal is capacitively coupled to transistor Q2 and converted to DC by the diode at the base of transistor Q3. The DC signal is amplified by transistors Q3 and Q4. Transistor Q4 provides current to operate the pen motor coil. The diode across the pen motor protects transistor Q4 from high voltage transients resulting in collapse of the magnetic field when Q4 turns off.

This activity monitor has been used successfully with the cave cricket *Ceuthophilus conicaudus* Hubbell under both laboratory and field conditions. Fig. 2 illustrates a twelve hour record (between 1800 and 0600 hr CST) of the results of a preliminary investigation of cricket activity while the crickets were maintained in an environmental chamber under constant darkness at a constant temperature (21 C). The activity monitor was also adapted to studying cricket movement within Spider Cave of Carlsbad Caverns National Park (Campbell, 1975, Amer. Midl. Natur. in press). That study demonstrated two nocturnal periods of movement with a corresponding reduction of movement in the cave during the "daylight" hours. The development of this monitor was supported in part by the Cave Research Foundation Grant.—Glenn D. Campbell and E. Norbert Smith, *Department of Biological Sciences, Texas Tech University, Lubbock, 79409.*